CLAIMS

1. A battery remaining capacity calculating method for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery, said battery remaining capacity calculating method comprising:

a voltage measuring step of measuring an output voltage value of said secondary battery;

a mode determining step of dividing a use mode of said secondary battery into a high consumption mode in which the output voltage value is not lower than a threshold value and a low consumption mode in which the output voltage value is lower than the threshold value;

a low consumption time remaining capacity calculating step of calculating a remaining capacity in said low consumption mode on a basis of a predetermined reference voltage curve as a discharge characteristic of said secondary battery and said output voltage value; and

a high consumption time remaining capacity calculating step of calculating a remaining capacity in said high consumption mode supposing that there is little change in the remaining capacity at a time of change from said low consumption mode to said high consumption mode.

2. The battery remaining capacity calculating method as claimed in claim 1, further comprising:

an initializing step of setting a reference remaining capacity as a remaining capacity before the use mode change and a start voltage as an output voltage at a time of a start of the high consumption mode,

wherein in said high consumption time remaining capacity calculating step, a remaining capacity is calculated on a basis of said reference remaining capacity, said start voltage, a predetermined cutoff voltage of said secondary battery, and said output voltage value.

3. The battery remaining capacity calculating method as claimed in claim 2, wherein the remaining capacity Qm in said high consumption mode is calculated by an equation

$$Qm = Qn - Qn\frac{(Vn-Vm)}{(Vn-Vt)} = Qn(\frac{Vm-Vt}{Vn-Vt})$$

using the reference remaining capacity Qn, the start voltage Vn, the cutoff voltage Vt, and the output voltage value Vm.

4. The battery remaining capacity calculating method as claimed in claim 1, further comprising:

an initializing step of setting a voltage gap as an output voltage change at the time of the use mode change,

wherein in said high consumption time remaining capacity calculating step, a remaining capacity is calculated on a basis of said voltage gap and said output voltage value.

5. The battery remaining capacity calculating method as claimed in claim 4, wherein an addition voltage value (Vm + ΔV) is calculated by adding said voltage gap ΔV to said output voltage value Vm, and a remaining capacity at said addition voltage value (Vm + ΔV) on said reference voltage curve is set as the remaining capacity Qm in the high consumption mode.

6. The battery remaining capacity calculating method as claimed in claim 1, wherein whether said secondary battery is in said low consumption mode or in said high consumption mode is determined in said mode determining step by measuring an output current value of said secondary battery.

7. The battery remaining capacity calculating method as claimed in claim 1, wherein whether said secondary battery is in said low consumption mode or in said high consumption mode is determined in said mode determining step by detecting a change in output voltage of said secondary battery.

8. The battery remaining capacity calculating

method as claimed in claim 1, wherein whether said secondary battery is in said low consumption mode or in said high consumption mode is determined in said mode determining step on a basis of information from an electronic device side to which said secondary battery supplies power.

9. A battery remaining capacity calculating device for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery, said battery remaining capacity calculating device comprising:

voltage measuring means for measuring an output voltage value of said secondary battery; and

arithmetic means for performing information processing, a reference voltage curve as a discharge characteristic of said secondary battery being recorded in said arithmetic means;

wherein said arithmetic means divides a use mode of said secondary battery into a high consumption mode in which the output voltage value is not lower than a threshold value and a low consumption mode in which the output voltage value is lower than the threshold value,

said arithmetic means calculates a remaining capacity of said secondary battery in said low consumption mode on a basis of the voltage value measured

67

by said voltage measuring means and said reference
voltage curve, and

said arithmetic means calculates a remaining
capacity in said high consumption mode on a basis of a
reference remaining capacity as a remaining capacity
before a use mode change, a start voltage as an output
voltage at a time of a start of the high consumption mode,
a predetermined cutoff voltage of said secondary battery,
and said output voltage value.

10. The battery remaining capacity calculating
device as claimed in claim 9, wherein said arithmetic
means calculates the remaining capacity Qm in said high
consumption mode by an equation

$$Qm = Qn - Qn\frac{(Vn - Vm)}{(Vn - Vt)} = Qn\left(\frac{Vm - Vt}{Vn - Vt}\right)$$

using the reference remaining capacity Qn, the start
voltage Vn, the cutoff voltage Vt, and the output voltage
value Vm.

11. A battery remaining capacity calculating
device for calculating a remaining capacity as a capacity
of electricity dischargeable by a secondary battery, said
battery remaining capacity calculating device comprising:

voltage measuring means for measuring an output
voltage value of said secondary battery; and

68

arithmetic means for performing information processing, a reference voltage curve as a discharge characteristic of said secondary battery being recorded in said arithmetic means;

wherein said arithmetic means divides a use mode of said secondary battery into a high consumption mode in which the output voltage value is not lower than a threshold value and a low consumption mode in which the output voltage value is lower than the threshold value,

said arithmetic means calculates a remaining capacity of said secondary battery in said low consumption mode on a basis of the voltage value measured by said voltage measuring means and said reference voltage curve, and

said arithmetic means calculates a remaining capacity in said high consumption mode on a basis of a voltage gap as an output voltage change at a time of a use mode change and said output voltage value.

12. The battery remaining capacity calculating device as claimed in claim 11, wherein in said high consumption mode, the remaining capacity is calculated on a basis of said reference voltage curve and an addition voltage value ($Vm + \Delta V$) obtained by adding said voltage gap ΔV to said output voltage value Vm.

13. A battery remaining capacity calculating program for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery, said battery remaining capacity calculating program comprising making a processor perform:

a voltage measuring step of measuring an output voltage value of said secondary battery;

a mode determining step of dividing a use mode of said secondary battery into a high consumption mode in which the output voltage value is not lower than a threshold value and a low consumption mode in which the output voltage value is lower than the threshold value;

a low consumption time remaining capacity calculating step of calculating a remaining capacity in said low consumption mode on a basis of a predetermined reference voltage curve as a discharge characteristic of said secondary battery and said output voltage value; and

a high consumption time remaining capacity calculating step of calculating a remaining capacity in said high consumption mode supposing that there is little change in the remaining capacity at a time of change from said low consumption mode to said high consumption mode.

14. The battery remaining capacity calculating program as claimed in claim 13, wherein in said high

consumption time remaining capacity calculating step, the remaining capacity is calculated on a basis of a reference remaining capacity as a remaining capacity before the use mode change, a start voltage as an output voltage at a time of a start of the high consumption mode, a predetermined cutoff voltage of said secondary battery, and said output voltage value.

15. The battery remaining capacity calculating program as claimed in claim 13, wherein in said high consumption time remaining capacity calculating step, the remaining capacity is calculated on a basis of a voltage gap as an output voltage change at the time of the use mode change and said output voltage value.